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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/516,545 | 12/02/2004 | Takeshi Ichikawa | 03500.017320. | 2864 |
| 5514 7590 11/12/2009 FITZPATRICK CELLA HARPER & SCINTO 1290 Avenue of the Americas NEW YORK, NY 10104-3800 | | | | |
| EXAMINER | | | | |
| RAABE, CHRISTOPHER M | | | | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/516,545

Applicant(s)

ICHIKAWA ET AL.

Examiner

CHRISTOPHER M. RAABE

Art Unit

2879

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 November 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 6 and 47-63 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 6 and 47-63 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Applicant's submission, filed 2 November 2009, has been entered and acknowledged by the examiner.

Applicant's arguments, with respect to the rejections of the claims have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 6,47-63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lau et al. ("Field Emission from Metal-containing Amorphous Carbon Composite Films"

Diamond and Related Materials Vol. 10, 1727-1731) in view of Tuck et al. (WO 99/28939) and Hirano et al. (USPN 5986857) and Kobayashi et al. (USPN 6270389).

With regard to claims 6,47-63,

Lau et al. disclose in at least sections 1,2,3 a layer containing carbon (C) having an sp^3 bonding as a main component wherein a plurality of groups of particles (Co, Al, Ti) which are constituted by at least two particles which comprise metal selected from Co, Ni, and Fe as a main component, and are arranged in the layer; each of the particles comprises as a main component a material which has resistivity lower than resistivity of a material of the layer, graphene being arranged between adjacent particles, wherein surface unevenness of the layer is smaller than 1/10 of its film thickness in rms, wherein the layer has a thickness of 100 nm or less, wherein the surface of the layer is terminated with hydrogen. While Lau et al. do not disclose the concentration of the particles in the layer, the optimization of parameters, absent evidence to the contrary, has been held to be obvious to one of ordinary skill in the art at the time of the invention.

Lau et al. do not disclose the arrangement of the particles, the particles being monocrystalline having a diameter between 1nm and 10nm, the emitting device, or the hydrogen content. Kobayashi et al do disclose in at least column 26 an analogous carbon layer containing monocrystalline conductive particles having a diameter between 1nm and 10 nm, providing an electron emission material with enhanced emission characteristics and small variation. It would therefore have been obvious to incorporate the dimensions disclosed by Kobayashi et al. into the layer of Lau et al. Tuck et al. do disclose in pages 7, 10,33-35 and figures 8, 2b, 10a an analogous layer (19) formed on a cathode (18) of an emitter device having a light emitting member (68) wherein a density of the particles in the layer is $1 \times 10^{15}/\text{cm}^3$

or more and $5 \times 10^{17}/\text{cm}^3$ or less, the adjacent two particles are arranged in a range of 5 nm or less; one of the adjacent two particles is arranged to be nearer to the cathode electrode (18) than the other particle; and the plurality of groups of particles (231) are arranged apart from each other by an average film thickness of the layer or more, an insulating film (20) which is arranged on the cathode electrode and has a first opening; and a gate electrode (21) which is arranged on the insulating film and has a second opening, wherein: the first opening and the second opening communicate with each other; and the layer is exposed in the first opening, comprising an electron source, and a light-emitting member which emits light by being irradiated with electrons, providing a display device. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the features of Lau et al. with those of Tuck et al. in order to provide a display device. Additionally, Hirano et al. disclose in at least column 2, incorporating hydrogen into the amorphous carbon film (as of Lau) in order to reduce internal stress. It would therefore have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the hydrogen content disclosed by Hirano et al. into the layer of Lau et al. The optimization of parameters, absent evidence to the contrary, has been held to be obvious to one of ordinary skill in the art at the time of the invention.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHRISTOPHER M. RAABE whose telephone number is (571)272-8434. The examiner can normally be reached on m-f 7am-3:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on 571-272-2457. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/CR/

/NIMESHKUMAR D. PATEL/
Supervisory Patent Examiner, Art Unit 2879